British Journal of Venereal Diseases, 1978, **54**, 60–68

Abstracts

These selected abstracts and titles from the world literature are arranged in the following sections:

Syphilis and other treponematoses (Clinical and therapy)

Secondary syphilis presenting as a pruritic dermatosis
G. W. COLE, R. B. AMON, AND P. S. RUSSELL (1977).
Archives of Dermatology, **113**, 489–490

Neurosyphilis (Review Article)
R. D. CATTERALL (1977).
British Journal of Hospital Medicine, **17**, 585–604

Syphilis (Serology and biological false positive phenomenon)

Comparison between the automated reagin test and reagin screen test methods of VDRL screening tests for syphilis in use in a routine laboratory
R. D. SIMON AND A. M. PEACOCK (1977).
Journal of Clinical Pathology, **30**, 626–630

This paper compares the results of the automated reagin test (ART) with those of the reagin screen test (RST) on 1154 sera from patients attending a venereal disease clinic. TPHA tests were also performed on all sera by a modified method, which is not described, and FTA–ABS tests carried out on reactive sera.

1028 sera were negative in all three screening tests, 66 were positive in all tests, 42 gave positive TPHA and FTA–ABS tests but the ART and RST results were negative. Sixteen sera gave positive RST but negative ART results, TPHA and FTA–ABS tests were positive on all of these. Quantitative tests on 15 sera showed that the RST gave titres two to four times greater than the ART. The RST gave clearer readings than the ART with weakly reactive sera; it is suggested that the RST in combination with the TPHA test provides a satisfactory combination for screening purposes.

A. E. Wilkinson

[Reprinted from *Abstracts on Hygiene*, by permission of the Editor.]

Test di emoagglutinazione treponemica (TPHA). Validità del micrometodo esoguito con le diluizioni dei sieri 1/20–1/40. (Treponemal haemagglutination test (TPHA). Validity of the micromethod with serum dilutions of 1/20–1/40)
E. ALESSI AND L. SCIOCCATI (1977).
Bollettino dell'Istituto Sieroterapico Milanese, **56**, 102–107

The authors found that the sensitivity of the microTPHA test with sera diluted 1 in 80 was less than that of the macrotest at the same dilution, particularly in early syphilis. Microtests at dilutions from 1 in 20 to 1 in 160 were carried out in parallel with macrotests on 773 sera. Nine sera gave invalid results in the microtest owing to agglutination of the control cells, all the macrotests gave valid results. All 235 sera examined from patients thought not to have syphilis, gave negative TPI and FTA–ABS tests; three of these were positive by the micromethod and one by the macrotest. A further 50 sera had given false positive results with standard tests as judged by negative TPI and FTA–ABS results; four of these gave positive micro- and two positive macrotests. In tests on 180 sera from patients with untreated early syphilis and 299 with treated early infections the sensitivity of the microtest at a dilution of 1 in 20 was virtually equal to that of the macrotest at 1 in 80. These results suggest that the use of a test dilution of 1 in 20 in the micromethod increases its sensitivity to that of the macromethod without undue loss of specificity; further studies are desirable to confirm this.

A. E. Wilkinson

[Reprinted from *Abstracts on Hygiene*, by permission of the Editor.]

Serologic study of specimens with borderline FTA–ABS test reactivity
D. BAERTSCHY, R. GOLUBJATNIKOV, M. STEADMAN, AND S. L. INHORN (1977).
Health Laboratory Science, **14**, 177–182

Borderline FTA–ABS results were found on 2% of 23 807 sera examined at the Wisconsin State Laboratory of Hygiene and were confirmed on a second specimen of serum. Of the 479 patients concerned, 60% were women, but this probably reflects only the sex ratio of the whole group. Borderline reactivity was found in all age groups but was commoner in those 50 years of age or older. Tests for antinuclear antibody were performed on 461 of the sera; seven gave positive and eight inconclusive results. These were not limited to any age group and the presence of antinuclear antibody did not seem to

be a common cause of borderline FTA–ABS reactions. TPHA tests were found reactive at a titre of 1 in 80 or above in only 79 of the 479 sera; positive results were commoner in patients over 50 years of age. Of the 466 patients followed-up, 11·4% were considered to have present or past syphilis, 38% were thought to be free from infection, and the records were inadequate to assess the state of the remainder.

A. E. Wilkinson

[Reprinted from *Abstracts on Hygiene*, by permission of the Editor.]

Spinal syphilis: the problem of fluorescent treponemal antibody in the cerebrospinal fluid

J. F. JOHN AND A. C. CUETTER (1977). *Southern Medical Journal*, **70**, 309–311

Three cases of late onset, non-tabetic, spinal syphilis are described, in which other causes of the spinal syndromes are excluded.

Case 1 A 49-year-old woman with a sudden onset of flaccid paraplegia consistent with thrombosis of the anterior spinal artery, had been known to have positive syphilitic serology for four years and had received penicillin treatment. Her serum FTA–ABS and RPR results were positive.

The cerebrospinal fluid was acellular, with a raised protein of 42 mg/100 ml (0·42 g/l). The cerebrospinal fluid VDRL and FTA results were positive.

Case 2 A 43-year-old man had, at the age of 12 years, received treatment for syphilis and serology had remained positive for at least 14 years before he developed progressive combined disease of his posterior and lateral columns which was treated with penicillin. It worsened one year later and at that time there were 4 cells/mm³ in his cerebrospinal fluid, the protein was 49 mg/100 ml (0·49 g/l); the cerebrospinal fluid VDRL result was negative and the FTA test positive.

Case 3 A 63-year-old woman with no previous history of syphilis developed a transverse myelitis. Her serum RPR and FTA–ABS results were positive, the cerebrospinal fluid acellular with a total protein of 29 mg/100 ml (0·29 g/l) and slight elevation of the gammaglobulin fraction, the cerebrospinal fluid VDRL was negative and the FTA positive.

It is noted from these cerebrospinal fluid findings that the diagnosis of syphilis should be accepted with reluctance, but the nature of the syndromes and the positive cerebrospinal fluid FTA tests support the belief that neurosyphilis caused the myelopathic process. It is argued that failure to improve after treatment with penicillin does not exclude the diagnosis of neurosyphilis and that the cerebrospinal fluid FTA–ABS is not a reflection of the serum activity, but a separate response arising within the cerebrospinal fluid.

Michael Kelsey

Routine tests for syphilis on cerbrospinal fluid (Leading Article) (1977). *Lancet*, **2**, 595

Syphilis (Pathology and experimental)

Specific direct fluorescent antibody detection of *Treponema pallidum*

K. C. DANIELS AND H. S. FERNEYHOUGH (1977). *Health Laboratory Science*, **14**, 164–171

Smears of exudate from 350 lesions were sent to a laboratory for direct fluorescent antibody tests (DFT) for *Treponema pallidum* and the results compared with those of ordinary darkground (DG) examinations. 118 of the patients had syphilis; the DFT was positive in 103 of these and the DG in 87. The DFT was negative on material from all of the 232 patients who were thought not to have syphilis; the DG was positive on six of these, but the results were thought to be falsely positive. In a further 75 cases the DFT was compared with FTA–ABS tests on blood collected at the same time as the exudate. The DFT was positive in 12 and the FTA–ABS test in 14. The DFT is thought to be as reliable as the conventional DG in the diagnosis of early syphilis. It offers advantages when the lesion is on a site which may harbour commensal treponemes, such as the mouth or rectum, or when the DG is inconclusive or is not available. The need for care in preparing smears for the DFT is rightly stressed.

A. E. Wilkinson

[Reprinted from *Abstracts on Hygiene*, by permission of the Editor.]

Catabolism of glucose and fatty acids by virulent *Treponema pallidum*

N. L. SCHILLER AND C. D. COX (1977). *Infection and Immunity*, **16**, 60–80

We describe a procedure which permits essentially full recovery of physiologically active *Treponema pallidum* from rabbit testicular extracts and greatly reduces contaminating tissue material. Such preparations were employed for investigations of the ability of *T. pallidum* to catabilise glucose and fatty acids. Radiospirometric studies revealed that glucose and pyruvate, but not oleate or palmitate, could be degraded to CO_2. The use of differentially labelled glucose, in conjunction with enzymatic analyses, indicated that glucose was catabolised by a combination of the Embden-Meyerhoff-Parmas and hexose monophosphate pathways. Pyruvate was degraded to CO_2 from only the carbonyl position, suggesting the absence of a functioning tricarboxylic cycle; this was substantiated by additional enzyme analyses and radiorespirometric experiments. Oleate and palmitate were incorporated but not catabolised by β-oxidation. Glucose, although catabolised, was not incorporated. The potential significance of these findings is discussed.

Author's summary

The effect of *Treponema pallidum* on mouse survival

D. J. M. WRIGHT AND F. P. WHARTON (1977). *Journal of Medical Microbiology*, **10**, 245–248

Gonorrhoea (Clinical)

Acute adult respiratory distress syndrome associated with gonococcal septicaemia

J. D. MARKHAM, J. R. VILSECK, AND W. J. O'DONOHUE (1976). *Chest*, **70**, 667–669

Sepsis appears to be an important factor in the causation of the acute respiratory distress syndrome in adults. A case of this syndrome caused by gonococcal septicaemia is reported in this paper.

A 40-year-old woman was given aspirin by her physician for pain in her left knee and left arm. Her symptoms increased and she reported two days later at the local hospital. By this time she was acutely ill. She was transferred to the intensive care unit after 40 ml of cloudy

yellowish fluid had been aspirated from her left knee.

The patient was uncooperative, delirious, and breathing rapidly. Her blood pressure was 116/64 mmHg, pulse 102/min, and respiration 22–28/min. The white cell count was 18 800/μl ($18{\cdot}8 \times 10^9$/l), predominantly polymorphonuclears. Examination showed that the lungs and heart were normal, apart from a marked tachycardia. There was an effusion in the left knee, which was swollen and tender. Pelvic examination showed a profuse yellowish-green purulent vaginal discharge.

The patient was sedated with diazepam, and treatment with digoxin was begun. Antibiotic therapy was continued with intravenous ampicillin, but this was changed to intravenous penicillin G 10 megaunits daily and probenecid 1 g daily, when the cervical culture was found to be positive for *N. gonorrhoeae*. The blood and joint fluid cultures were negative. After arterial blood gas analysis, intensive respiratory care was begun with methylprednisone intravenously and frusemide intramuscularly; acute respiratory distress syndrome was suspected, and serial radiograms confirmed this later. The patient made a rapid recovery and was discharged from hospital fully ambulatory 13 days after admission.

The authors point out that the increasing incidence of gonorrhoea will inevitably be associated by a greater incidence of complicated and unusual cases presenting to physicians.

C. S. Ratnatunga

Gonococcal meningitis and ventriculitis in the presence of a ventriculoperitoneal shunt

R. C. NOBLE AND R. M. COOPER (1977). *Sexually Transmitted Diseases*, **4**, 9–11

Gonorrhoea (Microbiology)

Survival of *Neisseria gonorrhoeae* on surfaces

T. ELMROS (1977). *Acta Dermato-venenerologica*, **57**, 177–180

The aim of the study was to investigate the survival of *N. gonorrhoeae* outside the body. When pus from cases of urethral gonorrhoea was kept on a glass surface and incubated at 22°C, at the end of 24 hours gonococci could be cultured in three out of four cases. After 48 hours' incubation at this temperature, no organisms could be isolated. The organisms appeared to survive in pus much better at a lower temperature, isolates being obtained from four of 10 specimens kept at a temperature of 4°C for two days. Similar results were obtained using a linen surface.

When organisms were incubated with serum at 22°C, it was shown that a slow decrease in the number of viable gonococci occurred during the first 60 minutes. In the succeeding 30 minutes, damage rapidly developed so that by 90 minutes only 0·1% of the number of organisms in the initial inoculum were recoverable. There then followed a gradual decline in the number of viable organisms, and by 24 hours only 0·002% of the inoculum survived. When the organisms were suspended in saline in the place of serum, the same initial response was obtained, but there was no gradual decline after 90 minutes, all organisms having been affected by this time.

It was suggested that dehydration was the main external cause of oganismal death and that the protective effect of serum and secretions was attributable to the hygroscopic properties of these fluids, diminishing water loss. An alternative hypothesis was that proteins in these fluids absorbed factors toxic to the bacteria. That the survivors were not mutants resistant to desiccation was shown by culturing the surviving organisms at 24 hours, and showing that the survival curves were identical with those previously obtained with the less hardy organisms.

A. McMillan

Growth pattern and cell division in *Neisseria gonorrhoeae*

B. WESTLING-HÄGGSTRÖM, T. ELMROS, S. NORMARK, AND B. WINBLAD (1977). *Journal of Bacteriology*, **29**, 333–342

The Gram-negative coccus *Neisseria gonorrhoeae* was found to grow regularly in at least two dimensions. Growth proceeded at a linear rate sequentially in each dimension. Growth in the second dimension (former width) was initiated slightly before the pole-division plane distance equalled the cell width. Penicillin treatment localised presumptive growth zones to the existing septum region. It was suggested that new growth zones were always formed perpendicular to the longitudinal axis created in the incipient daughter cells of a dividing coccus. Neither penicillin nor nalidixic acid induced filaments of *N. gonorrhoeae*. Such structures could nevertheless be formed in the rod-shaped species *Neisseria elongata*. *N. gonorrhoeae* divides by septation; however, complete septal structures with separated cytoplasms were uncommon. It is proposed that *N. gonorrhoeae* be regarded as a short rod which always extends parallel to the actual longitudinal axis and which never undergoes a rod-sphere transition.

Author's summary

Isolation and characterisation of a rough colony type of *Neisseria gonorrhoeae*

N. F. JACOBS, S. J. KRAUS, C. THORNSBERRY, AND J. BULLARD (1977). *Journal of Clinical Microbiology*, **5**, 365–374

This new colony type was found in eight of 180 primary cultures from men with gonococcal urethritis. BBL GC agar base supplemented with IsoVitaleX (10 ml/l) was used for isolation and strains were identified by fermentation tests. After 20 hours' incubation at 35°C in candle jars the rough colonies were 0·3–0·6 mm in diameter with a highly granular surface and irregular periphery. In six of the primary cultures they predominated with only scattered type 1 and type 2 colonies; in two cases 90% of the colonies were type 1 and 10% the rough form. The rough characteristic could be maintained by selective subculture, but if transfers were made non-selectively, smooth type 3 and 4 colonies became predominant after about six passages. The rough forms were pilated and autoagglutinated in saline. Sensitivity to ampicillin, penicillin, tetracycline, and spectinomycin was not significantly different for rough colonies and type 1 colonies derived from the same primary isolates. The rough forms produced infection in subcutaneous chambers in guinea-pigs but were gradually supplanted by type 1 colonies. After inoculation of chambers with type 1 colonies from strains showing rough variants the predominant colony type was always type 1 with only occasional rough colonies.

A. E. Wilkinson

Simplified complete medium for the growth of *Neisseria gonorrhoeae*
R. T. JONES AND R. S. TALLEY (1977).
Journal of Clinical Microbiology, **5**, 9–14

An enriched medium for growth of *Neisseria gonorrhoeae* was tested using 10 laboratory and 67 (in methods 37) clinical isolates. The basal medium (in g/l) comprised polypeptone peptone 15, $K_2HPO_4$4, $KH_2PO_4$1, NaCl5, soluble starch 1, and purified agar (Difco) 10. The supplements in μg/ml were glucose 5000, thiamine 2, ferric nitrate 5, cysteine 5, hypoxanthine 5, and uracil 10.

Comparative studies using GC agar base (BBL) and IsoVitaleX 10 ml/l showed no increased plating efficiency for the new medium, and incorporation of VCN inhibitor (BBL) 10 ml/l did not affect isolation. Culture on liquid media made as above, but with sodium bicarbonate 500 μg/l substituted for starch and agar, yielded a generation time of 30·5 minutes in the log growth phase for *N. gonorrhoeae* with an exponential decline in viable bacteria (colony forming units) from 8 hours where the count was 5×10^9 cfu/ml to 10^4 cfu/ml at 48 hours. Neutralisation of toxicity of different sources of agar by starch was also studied.

D. J. M. Wright

***In vitro* inhibition of growth of *Neisseria gonorrhoeae* by genital micro-organisms**
D. KAYE AND M. E. LEVISON (1977).
Sexually Transmitted Diseases, **4**, 1–3

The ability of micro-organisms present in titres of over 10^5/ml in the vaginal or cervical secretions to inhibit growth of *N. gonorrhoeae in vitro* was tested. Study of a strain of *N. gonorrhoeae* against 77 micro-organisms demonstrated that most strains of *S. epidermidis*, *S. aureus*, and the one *Gaffkya anaerobia* interfered with the growth of the *N. gonorrhoeae*. A few strains of *S. viridans*, *Neisseria*, *Candida*, and *Bifidobacterium* demonstrated interference. No strains of enterococcus, diptheroids, aerobic *Lactobacillus*, *Peptostreptococcus*, *Peptococcus*, anaerobic *Lactobacillus*, or *Veillonella* demonstrated interference.

Authors' summary

Binding of progesterone to *Neisseria gonorrhoeae* and other Gram-negative bacteria
R. D. MILLER AND S. A. MORSE (1977).
Infection and Immunity, **16**, 115–128

Interaction of *Neisseria gonorrhoeae* with guinea-pig defence mechanisms in subcutaneously implanted chambers
D. R. VEALE, D. SEN, C. PENN, H. FINCH, H. SMITH, AND K. WITT (1977).
FEMS Microbiology Letters, **1**, 3–6

Evaluation of a serologic test for gonorrhea in a low-risk female population
M. NELSON, E. J. PORTONI, M. ISHIDA, AND M. J. FELDMAN (1977).
Southern Medical Journal, **70**, 316–319

Gonorrhoea: Therapy

The bactericidal action of spectinomycin on *Neisseria gonorrhoeae*
M. E. WARD (1977).
Journal of Antimicrobial Chemotherapy, **3**, 323–329

The *in vitro* bactericidal activity for gonococci of four different antibiotics—penicillin, tetracycline, kanamycin, and spectinomycin—at their appropriate peak serum concentrations was compared. Spectinomycin was much more rapidly bactericidal for gonococci than the others; this contrasts sharply with the bacteristatic action of spectinomycin for *Escherichia coli* at concentrations as high as 1 mg/ml. This rapid bactericidal action may be advantageous for any attempts to eradicate penicillinase-producing gonococci. Electron microscope studies showed that spectinomycin produces alterations in gonococcal surface morphology leading to lysis. No significant differences were detected by sodium dodecyl sulphate polyacrylamide gel electrophoresis between the outer envelope proteins of gonococci grown in the presence or absence of spectinomycin, but there was evidence of ultrastructural damage to the cytoplasmic membrane. It is suggested that spectinomycin may inhibit the synthesis of a critical cytoplasmic membrane protein leading to ultimate impairment of the osmotic integrity of the cell.

Author's summary

Pivampicillin with probenecid in the treatment of gonorrhoea
M. A. WAUGH AND K. C. NAYYAR (1977).
Clinical Trials Journal, **14**, 152–155

Penicillinase-producing *Neisseria gonorrhoeae* (Letter)
R. M. ROBINS-BROWNE, M. C. GAILLARD, H. J. KOORNHOF, AND A. C. MAUFF (1977).
South African Medical Journal, **51**, 568

The sensitivity of gonococci to penicillin
A. E. WILKINSON (1977).
Journal of Antimicrobial Chemotherapy, **3**, 197–198

Control of penicillinase-producing gonococci (Leading Article) (1977).
British Medical Journal, **1**, 1617–1618

Non-specific genital infection

The etiology of non-gonococcal urethritis in men attending a venereal disease clinic
J. L. WONG, P. A. HINES, M. D. BRASHER, G. T. ROGERS, R. F. SMITH, AND J. SCHACHTER (1977).
Sexually Transmitted Diseases, **4**, 4–8

Non-gonococcal urethritis was identified as a main reason for men attending our venereal disease clinic. The prevalence of several agents that might cause non-gonococcal urethritis was determined. Attempts were made to isolate gonococci, chlamydiae, *Ureaplasma urealyticum*, trichomonads, *Candida* sp. and *Corynebacterium vaginale* from urethral swabs from 307 men. Chlamydiae were recovered from 31% of the 67 men with non-gonococcal urethritis compared with only 4% of 86 asymptomatic men without pyuria. Unexpectedly, cultures from only 4% of the 99 men with gonorrhoea also yielded chlamydiae. *Ureaplasma urealyticum* was recovered from nine of 27 asymptomatic men (33%), 16 of 30 men with non-gonococcal urethritis (53%), and 16 of 38 men with gonorrhoea (42%). These differences were not statistically significant. However, when *Chlamydia*-positive men were excluded from the analysis, a significant association was found for *U. urealyticum* and non-gonococcal urethritis. Twelve of 18 (76%) men with non-chlamydial non-gonococcal urethritis yielded the organism compared with eight of 26 (31%) men without urethritis. The other organisms sought were not often recovered and could not be associated with non-gonococcal urethritis.

Authors' summary

Etiology of non-gonococcal urethritis. Evidence for *Chlamydia trachomatis* and *Ureaplasma urealyticum*

W. R. BOWIE, S. P. WANG, E. R. ALEXANDER, P. S. FORSYTH, H. M. POLLOCK, J. S. L. LIN, T. M. BUCHANAN, AND K. K. HOLMES (1977). *Journal of Clinical Investigation*, **59**, 735–742

Chlamydia trachomatis, *Ureaplasma urealyticum* (T. mycoplasma), and *Haemophilus vaginalis* have previously been considered possible aetiological agents in non-gonococcal urethritis (NGU). In this study, current *C. trachomatis* infection was confirmed by culture and/or micro-immunofluorescence serology in 26 of 69 men experiencing a first episode of NGU, and in one of 39 without urethritis. Serum IgM immunofluorescent antibody to *Chlamydia* was demonstrated in 16 of 20 men with *Chlamydia* culture positive NGU, and in three of 39 with *Chlamydia* culture negative NGU, and in none of 34 without urethritis. Nine of 10 culture positive men with symptoms of $\leqslant 10$ days developed immunofluorescent antibody seroconversion in paired sera. *U. urealyticum* was isolated significantly more often and in significantly higher concentrations from first voided urine from *Chlamydia*-negative cases of NGU than from *Chlamydia*-positive NGU. Ureaplasmacidal antibody titres increased fourfold in six men, four of whom had negative cultures for ureaplasma. *H. vaginalis* was isolated from 19 of 33 men with no urethritis and from two of 69 with NGU. *C. trachomatis* is susceptible and *U. urealyticum* is resistant to sulphonamides. A 10-day course of sulphafurazole (Sulphisoxazole) therapy produced improvement in 13 of 13 *Chlamydia*-positive, ureaplasma-negative, and in only 14 of 29 *Chlamydia*-negative, ureaplasma-positive NGU cases ($P<0.002$). Thus, culture, serology, and response to therapy support the aetiological role of *Chlamydia* in NGU. Quantitative culture and response to therapy suggest *U. urealyticum* may cause many cases of *Chlamydia*-negative NGU.

Authors' summary

The developmental cycle of *Chlamydia trachomatis* in McCoy cells treated with cytochalasin B

P. STIRLING AND S. RICHMOND (1977). *Journal of General Microbiology*, **100**, 31–42

The growth of a genital trachoma-inclusion conjunctivitis agent strain of *Chlamydia trachomatis* in McCoy cells treated with cytochalasin B was studied by quantitative infectivity estimations and by light and electron microscopy. Provided that infection of the monolayer was initiated by centrifuging the infectious particles on to the cells before incubation, this chlamydial strain grew as fast and to as high a titre (approximately 10^7 inclusion-forming units (ifu) per culture) as those chlamydiae which infect cell cultures *in vitro* without centrifugation. Each ifu inoculated yielded approximately 600 ifu, and extracellular infectivity was detected soon after intracellular infectivity appeared. Inclusions were recognised by fluorescent antibody staining techniques early in the developmental cycle when cultures were not infectious and when only reticulate bodies were seen by electron microscopy. Inclusions were recognised in Giemsa-stained preparations examined by darkground microscopy only when elementary bodies appeared in the inclusions. Iodine staining was not a reliable indicator of either the number of inclusions present or of their infectivity.

Authors' summary

Antimicrobial activity of several antibiotics and a sulfonamide against *Chlamydia trachomatis* organisms in cell culture

C-C. KUO, S-P. WANG, AND T. GRAYSTON (1977). *Antimicrobial Agents and Chemotherapy*, **12**, 80–83

Minimum inhibitory concentrations of several antibiotics and a sulphonamide for growth of the 15 known immunotypes of *Chlamydia trachomatis* were determined in HeLa 229 cell cultures. The concentrations for complete inhibition of infectious-organism production were (per ml): tetracycline, 0·22 to 0·5 μg; rosamicin, 0·05 to 0·25 μg; erythromycin, 0·1 to 0·5 μg; chloramphenicol, 10 μg; penicillin, 0·02 to 50 u; ampicillin, 0·1 to 50 μg; and sulphafurazole (Sulfisoxazole), 2 to 200 μg. The same concentrations of tetracycline, rosamicin, erythromycin, and chloramphenicol were sufficient to inhibit *C. trachomatis* inclusion formation. An increased concentration of sulphafurazole was often needed to inhibit inclusion formation. Penicillin at 100 u/ml and ampicillin at 100 μg/ml failed completely to inhibit inclusion formation.

Authors' summary

The effect of penicillin on genital strains of *Chlamydia trachomatis* in tissue culture

F. W. A. JOHNSON AND D. HOBSON (1977). *Journal of Antimicrobial Chemotherapy*, **3**, 49–56

The growth in McCoy cell tissue culture of strains of *Chlamydia trachomatis* recently isolated from genital infections was examined quantitatively after incubation with benzylpenicillin. An extracellular concentration of 0·1 unit/ml throughout incubation prevented the development of normal fluorescent chlamydial inclusions, but even at high concentration (100 units/ml) abnormal non-fluorescent inclusions developed. Erythromycin, chloramphenicol, and tetracycline inhibited the growth of the organisms without producing abnormal inclusions. The effect of delayed addition of penicillin or its removal during incubation was investigated. The possible nature of the abnormal inclusions resulting from exposure to penicillin is discussed.

Authors' summary

Human intra-urethral inoculation of ureaplasmas

D. TAYLOR-ROBINSON, G. W. CSONKA, AND M. J. PRENTICE (1977). *Quarterly Journal of Medicine*, **183**, 309–326

Ureaplasma urealyticum was isolated from two men suffering from non-specific urethritis and from whom no other micro-organism was recovered. Their disease responded to tetracycline. The two ureaplasma strains were cloned and shown to belong to serotype 5 of *U. urealyticum*. An inoculum containing 5×10^4 colour-changing units of one strain was introduced intraurethrally into a subject (an author) who was free of ureaplasmas and other urethral micro-organisms. The ureaplasmas multiplied in the urethra and the subject soon experienced symptoms of dysuria. Furthermore, polymorphonuclear leucocytes were found in centrifuged aliquots of urine and a serum metabolism-inhibition antibody response of short duration was detected. Tetracycline given six days after inoculation brought about rapid clearance of organisms from the urine and a more gradual disappearance of symptoms and signs. Inoculation of ureaplasma-free medium about two months after the

initial introduction of ureaplasmas did not elicit symptoms or signs. These observations showed that the ureaplasmas had produced urethritis.

Organisms of the other ureaplasma strain were introduced in the same number and in the same way into a second subject (another author) who was also free of urethral micro-organisms. He experienced symptoms and signs similar to the first subject, ureaplasmas were consistently isolated from urine, and a serum antibody response of at least three months' duration was detected. However, the characteristic feature was the appearance of urinary threads composed of epithelial cells and polymorphonuclear leucocytes. Tetracycline therapy was instituted and one month after inoculation viable ureaplasmas were rapidly eliminated from the urogenital tract and, although most signs disappeared, urinary threads continued to appear. Inoculation of ureaplasma-free media during two months after the initial challenge elicited some symptoms and signs, but these were less than those which occurred after introduction of ureaplasmas. Analysis of seminal fractions during the course of the ureaplasma infection indicated that the prostate was infected. There is a possibility that the threads were of prostatic origin and the reason for their persistence is discussed.

Authors' summary

Morphology of *Ureaplasma urealyticum* (T. mycoplasma) organisms and colonies

S. RAZIN, G. K. MASOVER, M. PALANT, AND L. HAYFLICK (1977). *Journal of Bacteriology*, **130**, 464–511

Treatment of TRIC infection of the eye with rifampicin or chloramphenicol

S. DAROUGAR, M. VISWALINGAM, J. D. TREHARNE, J. R. KINNISON, AND B. R. JONES (1977). *British Journal of Ophthalmology*, **61**, 255–259

Candidosis

How often is genital yeast infection sexually transmitted?

R. N. THIN, M. LEIGHTON, AND M. J. DIXON (1977). *British Medical Journal*, **2**, 93–94

Records from a clinic for sexually transmitted diseases have been used to study association between genital yeast infections and sexually transmitted diseases (STDs), non-sexually transmitted diseases (NSTDs), non-specific genital infections (NSGIs), and other conditions. Of 9094 disease episodes, 32·8% were in women, 60·5% in heterosexual men; genital yeast infections were present in 35·3% and 6·9% respectively of the episodes in each group. Yeast infection was associated with STDs and NSGIs but not with NSTDs or other conditions; they may have been sexually acquired in 39% of episodes in women and in 29% of episodes in heterosexual men. It is suggested that sexually active patients with genital yeast infections be screened for other STDs, particularly NSGI.

Tony Johnson

Detection of *Candida* precipitins by counterimmunoelectrophoresis: an adjunct in determining significant candidiasis

T. H. DEE AND M. W. RYTEL (1977). *Journal of Clinical Microbiology*, **5**, 453–457

Candida precipitins were determined by counterimmunoelectrophoresis (CIE) and double immunodiffusion (DID) techniques, using whole cell extracts as antigen (Hollister-Stier Labs). Sera from 164 patients were examined. Correlation between the two methods was high among 24 patients with significant *Candida* infection, and precipitin titres of 1:8 or more were detected by CIE in 17 of 22 patients with positive precipitins. Of 97 patients with either colonisation or transient infection, 50 were precipitin positive by CIE and two by DID, only three patients having a titre of 1:8. Among non-*Candida* carriers (43), 12 gave positive precipitins by CIE only. The authors concluded that quantitative estimation of *Candida* precipitins by CIE was helpful in diagnosis.

B. M. Partridge

Humoral immunity in vaginal candidiasis

S. MATHUR, G. VIRELLA, J. KOISTINEN, E. O. HORGER, T. A. MAHVI, AND H. H. FUDENBERG (1977). *Infection and Immunity*, **15**, 287–294

Humoral antibody titres to *Candida albicans* were estimated by the passive-haemagglutination technique. Erythrocytes were coated with protein antigen using chromic chloride as coupling agent. Sera were obtained from 37 women with vaginal candidosis, and from 148 normal subjects (50 adult Americans and 98 Finnish blood donors). Antibody titres were higher in patients with vaginal infection, ranging from 4 to 256, compared with 0 to 16 in normal subjects. No precipitins were detected by the double-diffusion technique in sera from the infected patients. In three cases, antibodies to *C. albicans* were of the secretory immunoglobulin A type, as determined by gel filtration and double-diffusion tests, and confirmed by the indirect fluorescent antibody technique. The authors suggest that this antibody response in vaginal candidosis is mainly local.

B. M. Partridge

Comparison of cream of rice agar and horse serum for differentiating germ tubes of *Candida albicans* from filaments of *Candida tropicalis*

N. M. WARWOOD AND D. J. BLAZEVIC (1977). *Journal of Clinical Microbiology*, **5**, 501–502

Genital herpes

Correlation of herpes simplex virus Types 1 and 2 with clinical features of infection

S. WOLONTIS AND S. JEANSSON (1977). *Journal of Infectious Diseases*, **135**, 28–33

During the course of routine diagnostic virology work, 338 strains of herpes simplex virus (HSV) were isolated in Stockholm. These strains were identified as HSV Type 1 (HSV-1) or HSV Type 2 (HSV-2) by immunoelectro-osmophoresis. This technique clearly distinguished between HSV-1 and HSV-2 and no intermediate antigenic strains were identified. The antigenic type was correlated with the age, body site, and clinical features of infection in the patients from whom HSV was recovered. Findings agreed generally with earlier studies. Thus 85% of HSV strains isolated from genital and perigenital areas were typed as HSV-2; all but one strain isolated from the mouths of patients with stomatitis or the lips of patients with herpes labialis were Type 1. Isolates from patients with keratitis or conjunctivitis, and from adults with meningoencephalitis proved to be HSV-1, whereas strains from acute aseptic

meningitis were Type 2. Five cases of neonatal HSV infections, three of them fatal, are also described. HSV-1 was isolated from three of these babies, HSV-2 from the other two.

Shirley Richmond

Occurrence of genital herpes simplex and cytomegalovirus infections in pregnancy

E. VESTERINEN, E-R. SAVOLAINEN, E. PUROLA, E. SAKELA, AND P. LEINIKKI (1977).
Acta obstetricia et gynecologica Scandinavica, **56**, 101–104

Both herpes simplex virus (HSV) infection of the cervix and cytomegalovirus (CMV) infections of pregnant women present risks to the new born infant. Infection of infants by HSV during labour may result in illnesses varying from mild to severe generalised diseases resulting in death. Severely infected infants surviving may have permanent brain damage. Intrauterine infections with CMV commonly result in severe fetal damage resulting in microcephaly and mental retardation. The risks of infection during labour can be diminished by caesarean section but such a decision would, in the absence of obvious clinical findings, require rapid and accurate virological diagnosis. In this study a total of 244 pregnant women were screened for genital HSV and CMV infection using virus ioslation, cytological examination, and serological methods. HSV could not be isolated, but CMV was found in four of the women: no abnormal smears indicative of either virus infection were seen.

Study of exfoliated cells with HSV antiserum detected immunofluorescent cells in 34 (14%) of the patients. The authors could not exclude the possibility that these reactions were non-specific and so the significance of this finding is obscure.

These results indicate that the incidence of HSV infections is low in this group of obstetric patients, considerably lower than reported by workers in the United States in studies on lower socioeconomic groups.

Serologically 14% of those studied possessed HSV antibody but the numbers did not correspond to those with immunofluorescent positive exfoliated cells; 71% possessed CMV antibodies. No differences were seen in any of the parameters tested between the first or third trimesters of pregnancy. *P. Reeve*

***Herpesvirus hominis* Type 2 infections in asymptomatic pregnant women**

R. J. BOLOGNESE, S. L. CORSON, D. A. FUCCILLO, R. TRAUB, F. MODER, AND J. L. SEVER (1976).
Obstetrics and Gynecology, **48**, 507–510

This study investigated the incidence of previous and current *Herpesvirus hominis* (HVH) Type 2 infections in 985 asymptomatic pregnant women. Antibodies to HVH Types 1 and 2 were determined in sera from these patients by an indirect haemagglutination test; previous HVH Type 2 infections, identified by finding a Type 2/1 antibody index of 85 or more, were found in 352 (35·7%) of these 985 women. One hundred and twenty-four (12·6%) patients had no antibodies to either HVH Type 1 or 2, and 509 (51·7%) patients had an index of <85, indicating infection with Type 1 only.

Current HVH Type 2 infections were identified by isolating the virus from 5 of 770 (0·65%) antepartum cervical specimens. No virus was isolated from 211 amniotic fluid specimens. Two patients who yielded positive cervical cultures during the second trimester underwent voluntary termination of their pregnancies. Current HVH Type 2 infections were identified in the remaining three patients late in the third trimester; two of these patients delivered vaginally and one by caesarean section. No neonatal infections were reported.

Shirley Richmond

Clinical and virological findings in patients with cytologically diagnosed gynecologic herpes simplex infections

E. VESTERINEN, E. PUROLA, E. SAKSELA, AND P. LEINIKKI (1977).
Acta cytologica, **21**, 199–205

Papanicolaou smears from the female genital tract, obtained from patients attending the Department of Obstetrics and Gynaecology, Helsinki University Central Hospital, were examined for evidence of herpetic infection. A cytological diagnosis was made by finding multinucleated epithelial cells with nuclear homogenisation and chromatin margination, or if intranuclear inclusions were present. Herpes simplex virus (HSV) infection was identified in 90 slides (representing 85 patients) out of a total of 57 117 (0·16%) smears examined during 1972–74.

Cytological findings in these 85 patients were correlated with recorded clinical data and with histological, virological, and serological findings when these were available. Nearly half (43%) of the cytologically-diagnosed HSV infections were asymptomatic; 15 (17%) patients had general symptoms (fever and abdominal pain), and local symptoms (genital pain, dysuria, itching, or vaginal discharge) were present in 36 (42%) cases. Ulcerative lesions were found in 17 (19%) patients.

Characteristic cytological changes occurred predominantly on the ectocervix. Viral isolation was usually successful when performed within one week of cytological diagnosis, and viral antigens could be identified in the smears by fluorescent antibody staining during this time. No morphological differences were found between primary and recurrent HSV infections.

Dysplastic changes were more frequently seen in the HSV group of smears than in a control series of smears.

Shirley Richmond

Correlation of clinical and virus-specific immune responses following levamisole therapy of recurrent herpes progenitalis

R. J. O'REILLY, A. CHIBBARO, R. WILMOT, AND C. LOPEZ (1977).
Annals of the New York Academy of Sciences, **284**, 161–170

Recent investigations have reported that levamisole is effective in the treatment of labial and genital *Herpesvirus hominis* (HVH) infections. It has been suggested that this antiviral agent acts by enhancing the hosts' cell-mediated immune (CMI) responses to HVH. This paper is the report of a preliminary trial of the effect of levamisole on the clinical course of recurrent genital herpes infections and on HVH-specific CMI responses, in 15 patients with culture-proved genital herpes infections, recurring every 14 to 28 days. No controls were included, and the study was not done blind.

Patients were treated with levamisole 150 mg orally on two consecutive days weekly, and were studied two weeks after initiation of treatment and monthly thereafter for between five and nine months. The clinical course, assessed by the frequency of recurrences and by the pain and duration of each, was altered favourably in eight of 12 patients. Three patients reported no change, and one

patient reported increased frequency of infections. CMI responses, assessed by lymphocyte transformation and assay of leucocyte migration inhibitory factor to HVH antigen, were enhanced in six of the eight patients who reported fewer recurrences. In the four patients with no clinical improvement, CMI responses were depressed or unchanged. Alterations in HVH-specific CMI responses therefore correlated with changes in the clinical course of the infections.

Shirley Richmond

Effect of ribavirin on Type 2 *Herpesvirus hominis* (HVH/2) *in vitro* and *in vivo*

L. B. ALLEN, S. M. WOLF, C. J. HINTZ, J. H. HUFFMAN, AND R. W. SIDWELL (1977). *Annals of the New York Academy of Sciences*, **284**, 247–253

The effect of ribavirin (Virazole, ICN 1229), a synthetic antiviral compound, on the growth of Type 2 *Herpesvirus hominis* (HVH/2) was assessed in *in vitro* cell cultures and in experimentally induced tail and genital HVH/2 lesions in mice. Ribavirin inhibited the growth of five strains of HVH/2 tested in KB cell monolayers; there were strain differences in the sensitivity of ribavirin, the overall MIC range being 10–100 μg/ml. In the experimentally infected mice topical ribavirin reduced both tail and genital lesions induced by a single strain (VF-2) of HVH/2. Since intravaginal treatment with ribavirin initiated late in the infection was effective, this compound may have potential for treatment of human cutaneous infections of HVH/2.

Shirley Richmond

Simultaneous isolation of *Herpesvirus hominis* Type 2 and cytomegalovirus from the genital tract of a woman

F. R. MANUEL AND J. A. EMBIL (1977). *Sexually Transmitted Diseases*, **4**, 18–19

Herpes simplex virus Type 2 meningitis (Case Report)

J. E. HEVRON JR (1977). *Obstetrics and Gynecology*, **49**, 622–624

Other sexually transmitted diseases

Lymphogranuloma venereum presenting as superclavicular and inguinal lymphoadenopathy

P. D. WALZER AND D. ARMSTRONG (1977). *Sexually Transmitted Diseases* **4**, 12–14

Miscellaneous

Vaginal colonisation with group B *Streptococcus:* a study in college women

C. J. BAKER, D. K. GOROFF, S. ALPERT, V. A. CROCKETT, S. H. ZINNER, J. R. EVRARD, B. ROSNER, AND W. M. MCCORMACK (1977). *Journal of Infectious Diseases*, **135**, 2–397

The group B *Streptococcus* is now recognised as a common neonatal pathogen and is generally transmitted intrapartum from the maternal genital tract. Vaginal specimens were obtained from 499 college students. Group B *Streptococci* were isolated from 18%. Serotype III (37·9%) and II (25·3%) were particularly common. The factors which aided colonisation were the presence of an intrauterine device, sexual experience, age under 20, and during the first half of the menstrual cycle. Several other factors including a history of venereal disease were unrelated to colonisation. It appears that sexual experience and possibly host defence mechanisms which are age-related, were among the most important positively correlated factors.

G. W. Csonka

Isolation of *Neisseria meningitidis* in urogenital/rectal infections

K. ØDEGAARD AND T. GUNDERSEN (1977). *Acta dermato-venereologica*, **57**, 173–176

During 1975, *N. meningitidis* was isolated on 10 occasions from samples taken from urogenital and rectal sites in nine patients. Of the meningococci isolated, one belonged to serogroup A, six to group B, and two to group C. A total of 90 540 samples had been cultured for gonococci and 7045 had been positive.

Six patients (two women and four men) who had attended the Department of Venereal Diseases, Oslo, are described in detail. One woman had a slight vaginal discharge and meningococci were isolated from the cervix; both the meningococci and the symptoms cleared without treatment. The other woman had symptomless urethral meningococci which had disappeared 14 days later on repeat culture. Two of the four men were homosexual. Three had symptomless urethral meningococci which were absent at follow-up without treatment. The fourth man had symptomless rectal meningococci which could still be isolated 14 days later; he was considered to be a symptomless carrier.

D. H. Jackson

Patterns of sexually transmitted enteric diseases in a city

T. E. AINSWORTH, A. BACK, L. A. BOUCHER, W. F. GARRARD, R. D. PALMER, AND E. RIVER (1977). *Lancet*, **2**, 3–4

In the past three years cases of shigellosis, amoebiasis, and viral hepatitis A and B have increased fourfold to tenfold in San Francisco. These diseases were particularly common in people who had adopted 'alternative life-styles', especially young men. In many cases there was a history of frequent orogenital and oral-anal sexual contact between men with no common food source. Despite energetic public health measures and intensive efforts by physicians treating these cases, the increase has not yet been brought under control. Other cities may experience similar difficulties with sexual transmission of enteric diseases.

Authors' summary

Quantitative bacteriology of the vaginal flora

J. G. BARTLETT, A. B. ONDERDONK, E. DRUDE, C. GOLDSTEIN, M. ANDERKA, S. ALPERT, AND W. M. MCCORMACK (1977). *Journal of Infectious Diseases*, **136**, 271–277

Quantitative bacteriology was performed on vaginal secretions from healthy adult women. The analysis included a single sample from 17 college students and 35 samples from five volunteers collected at intervals of three to five days throughout the menstrual cycle. Mean concentrations in all 52 specimens were $10^{9.1}$ aerobic bacteria/g and $10^{9.1}$ anaerobic bacteria/g. The rank of predominant organisms, according to rates of recovery in concentrations of $>10^5$ colony-forming units/g, was anaerobic and facultative *Lactobacillus* species, *Peptococcus* species, *Bacteroides* species, *Staphylococcus epidermidis*, *Corynebacterium* species, *Peptostreptococcus* species, and *Eubacterium* species. Sequential samples collected throughout the menstrual cycle showed relatively consistent mean levels of anaerobes and a significant decrease in

concentrations of aerobes in premenstrual specimens compared with those in the specimens collected in the week following onset of menses. Analysis of sequential specimens from each of the five individuals showed considerable variation in species recovered. These data indicate that the vaginal flora in healthy adult women is a dynamic ecosystem in which anaerobes are usually the numerically dominant bacteria.

Authors' summary

The condom and gonorrhoea
D. BARLOW (1977). *Lancet*, **2**, 811–812

The use of the condom by male patients attending a clinic specialising in sexually transmitted diseases has been assessed over a period of six months. Condom users were divided into those who used them properly and invariably, and those who did not. In the group studied, correct use of the condom was associated with a significantly lower probability of acquiring gonorrhoea ($P<0.001$) and a significantly higher chance of there being no sexually transmitted disease diagnosed ($P<0.0005$). The diagnosis rate of non-specific urethritis, however, did not differ among the groups.

Author's summary

Inhibition of *Corynebacterium vaginale* by metronidazole
R. F. SMITH AND W. E. DUNKELBERG (1977). *Sexually Transmitted Diseases*, **4**, 20–21

Tellurite reduction test to aid in the recognition of *Corynebacterium vaginale*
R. F. SMITH, J. L. VOSS, AND R. K. BAILEY (1977). *Journal of Clinical Microbiology*, **5**, 375–380

The expanding spectrum of Behçet's syndrome
E. KANSU, S. DEGLIN, R. I. CANTOR, J. F. BURKE, S. Y. CHO, AND R. T. CATHART (1977). *Sexually Transmitted Diseases*, **237**, 1855–1856

Treatment of balanitis xerotica obliterans with testoterone propionate ointment
T. A. H. PASIECZNY (1977). *Acta dermato-venerologica*, **57**, 275

Book review

Burckhardt's Atlas and Manual of Dermatology and Venereology. Third American Edition. Edited by P. J. Lynch and S. Epstein. 1977. Pp. 271, 178 figures (including 111 in colour). Williams and Wilkins, Baltimore, USA (£26·00)

The first half of this book gives a brief account of the various skin diseases, including their treatment. Venereal diseases are devoted a chapter of eight pages and other diseases of the genitalia three pages. The preface states 'this was to be a short and simple, but nevertheless inclusive, introduction to dermatology and venereology for those who are not dermatologists'. This certainly does not apply to venereology. There are a total of six illustrations of genital lesions. Among the 18 illustrations of syphilitic lesions there are two rather similar ones of secondary palmar syphilides and one showing bismuth lines of the gums, surely now of only historical interest. The space would have been better used to provide a clinical illustration of scabies. In 1977 one might have expected an illustration of the skin lesions of gonococcal septicaemia. The only figure relating to gonorrhoea is one showing Gram-negative diplococci in black and white! There are some misleading statements—for example, that Hutchinson's teeth are 'notched central incisors'. The index gives page references to the figures but the pages of the section containing the figures are not numbered!

Anyone wanting an introduction to venereology will be disappointed and will certainly not want to pay £26.00 for this book.

P. Rodin

Notice

Dr R. D. Catterall has been appointed Adviser in Genitourinary Medicine to the Chief Medical Officer of the Department of Health and Social Security from 1 January 1978. He succeeds Dr C. S. Nicol who has retired.